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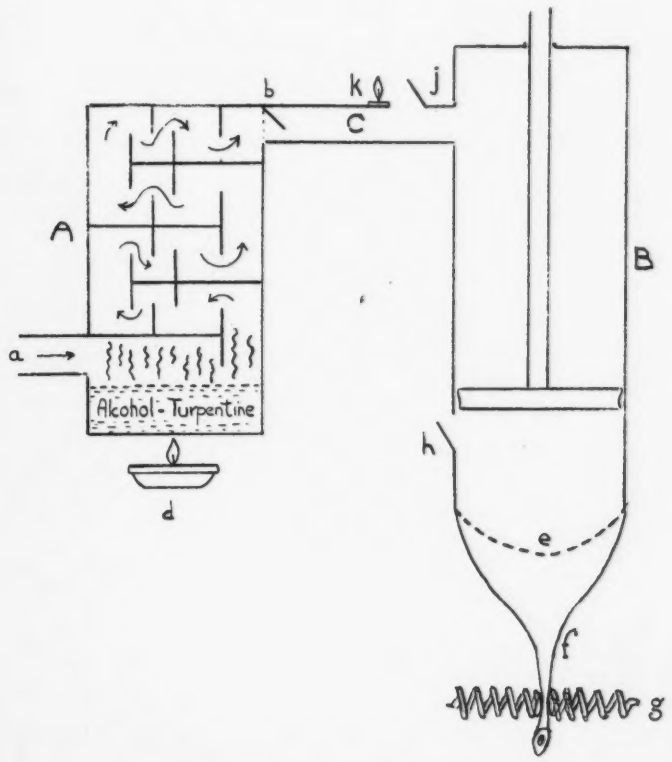
The First Internal Combustion Engine

By HOWARD G. HUBBARD
(South Hadley, Mass.)

This may be one for our good Mr. Ripley, it is doubtful if it would be of much interest to Sir Malcolm Campbell, but nevertheless it worked, and the date when its inventor, Samuel Morey, sent an account of it to Professor Benjamin Silliman was 1826. We risk the statement that this date entitles it to be called the first internal combustion engine.

It seems that Samuel Morey, of Oxford, New Hampshire, had been experimenting with mixtures of steam, turpentine, and alcohol as a fuel for lamps, thus antedating Isaiah Jen-

(*Continued on page* 19, *column* 3)



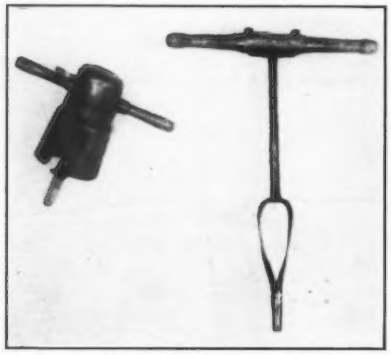
INTERNAL COMBUSTION ENGINE OF 1826.

Wooden Water Pipes

Prior to about 1820, pipes for conveying water, both in this country and in England, while sometimes of stone, were usually of wood. The Bank of the Manhattan Company, chartered as The Manhattan Company, in 1799, primarily for the purpose of constructing and maintaining a water supply system for the City of New York, originally laid wooden pipes, portions of which, showing the manner in which the sections were joined, are displayed today at the headquarters of the bank at No. 40 Wall Street. A small cross-section of this pipe, well authenticated and in the possession of the writer, measures nine inches across, the bore being two and one-half inches in diameter. Although these particular pipes were superseded in 1823, by pipes of cast iron, which had then become recognized as the best for conveying water in large volume, — lead being used for the smaller sizes, — wooden pipe continued to be used, especially for small establishments, until well after the middle of the 19th century.

Webster's *American Family Encyclopedia* (New York, 1859) states (page 548): "Wooden pipes are the least expensive at first and are easily made; they are best bored in trees of the proper size, and then the bark being left on preserves them. If small, the passage may be bored by a long auger, turned round by one or two men; but where the pipes are larger and the demand is great, as for supplying towns, machines are used to bore them. The great objections to wooden pipes are, their want of strength to resist a great pressure of water, and their liability to decay. They are usually made of elm or alder; oak would be preferable, if it were not too expensive. The lengths of pipe are fitted in by enlarging the bore at one end in a conical form with

a sort of auger, and cutting the opposite end taper to drive into the conical end of the adjacent pipe, which is hooped to prevent its splitting. Great care should be taken in fitting them well together to prevent leakage, and not to cut away too much of the wood at the taper end, which is frequently the cause of decay. Wooden pipes are apt to generate insects in their decayed or rotten parts, and water lying long in such pipes becomes putrid from the animal and vegetable matter collected in them."



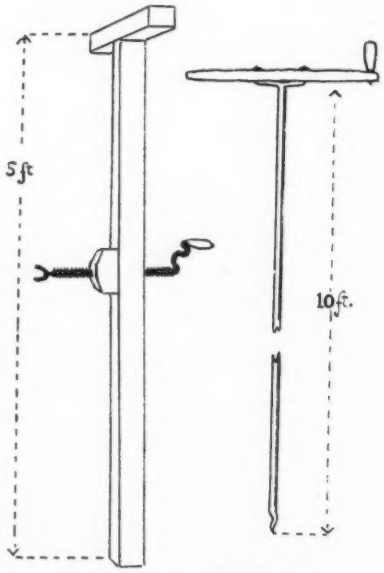
Left: Log Pipe End-Shaper.
Right: Log Pipe Reamer.

Mr. Arthur W. Gardner, of Greenfield, Mass., who, in 1929, went to great pains to secure for the writer one of these hand-made log pipes, interviewed a surviving eye-witness of the process by which they were made. Mr. Gardner reported as follows:

"An old man told me that he had seen log pipes installed for fifty cents a rod, the farmer to furnish cedar logs, eight feet long and about six inches in diameter. The blacksmith made rings for the bell (female) ends during the winter and installed the pipe on a unit price basis, the farmer to dig and back-fill the trench. The tools required were few in number,—a pod auger with a bit eight or nine feet long, a reamer and an end-shaper, together with a hatchet or axe. The logs were set up on a horse and banded on the bell end. Then the hole was bored through, lining the bit by eye, and when completely bored through, the (male) end was hewed off roughly round and smoothed off with the shaper. The bell end was then reamed out with a reamer that matched the shaper."

Certainly cedar, as specified by Mr. Gardner's informant, would be expected, when buried in the ground, to out-last elm, alder, or even oak, which Webster asserts were the preferred kinds of wood.

The end-shaper and the reamer are here illustrated. The left-hand blade of the reamer (in its position here shown) is sharpened on the under edge and the right-hand blade on the upper edge, so that, when the lower end of the tool was inserted in the bore of the pipe, and the handle turned clockwise, both blades would cut at once. The round piece projecting from the bottom of the end-shaper, was also intended to be thrust into the bore, and then the tool was used precisely as a gigantic pencil-sharpener. The statement that the auger was directed "by eye" was probably true, as a general proposition. The other illustration shows the auger and a device, procured by the writer with the other tools, which was stated to be for guiding the auger and which would appear to be adapted to that purpose. It is, however, much more crudely constructed than the other tools in the set, and was probably conceived and made "at home" by some one ingenious individual. The picture of the auger does not, unfortunately, show that the bit is cylindrical to a point about sixteen inches from the tip, where it becomes semi-cyclindrical, with one cutting edge.



Right: Log Pipe Auger.
Left: Device for Guiding Auger.

Salt From the Sea

According to *The Progress of Man and Society*, by the Rev. Dr. Trusler (London, undated, *circa* 1820), the usual way of procuring salt, was from sea-water, "which is fully impregnated with salt." Trusler says, "The method of doing this is as follows:

Salt Kettle.

The salt-pans are generally near the sea-side; the water from which is pumped up by a wind-pump, that is, a pump that acts by the wind; and is conveyed, by spouts, into a number of shallow basons, or reservoirs, on the ground, formed with clay about three or four inches deep, and from twenty to forty, or more, feet square. Here the water lies some days, to evaporate, which it does by the heat of the sun. The watery parts fly off, and the salt remains: of course, after a few days, this sea-water is thick with salt. From these pans it is conveyed into a boiling-house, by a similar pump; where it is boiled in coppers, till all the water is boiled away, and the salt left at the bottom, in a hard crust or rock, perfectly dry. From these coppers it is dug out with spades; and then put up into casks, to convey it to different parts." The illustration shows one of these "coppers," owned by the late W. W. Creamer, formerly of Waldoboro, Maine.

According to Richardson Wright's *Hawkers and Walkers in Early America*, (1921) a song called "Come Buy My Wooden Ware" was popular in Boston in 1799, and a wooden ware works was started in 1817 at Henniker, N. H., by Timothy Gillette. Knight's *American Mechanical Dictionary* (1876) illustrates a hand tool called a *scorper* "for working in a depression, as in hollowing bowls, butter ladles, etc."

Early American Industries Association

The Wool Spinner

By William B. Sprague
(43 Cedar Street, New York)

[The capital letters, interspersed through the text, refer to the list of authorities at the end of the article].

The spinning wheel was unknown in England until the reign of Henry VIII (1509-47), and is supposed to have been brought from India (J), where it had been in use for "many ages" (I). It was undoubtedly one of the indispensable articles which the first colonists brought to this country. In the latter part of the 18th century, many spinning machines were invented in England and America (E, I, J, K), but, partly because their products were not thoroughly satisfactory and partly because they were not suitable for domestic purposes, the old hand-driven wheel continued in almost universal use until about 1850 (J), and was occasionally put to work as late as 1880 (B).

In the November, 1934, issue of The Chronicle, under the heading, "The Wool Comber," and in the November, 1935, issue, under the heading "Wool Cards," it was explained how the wool was prepared for the spinner. Spinning wheels, both for flax and for wool, are so prevalent today that it seems unnecessary to describe the wool wheel, except to explain to the uninitiated that it is the large one, three feet or more in diameter, with a wide, smooth rim, and of rather crude construction, the flax wheel being less than half the size, with grooved rim, generally embellished with carving and turnings, and worked with a treadle. Incidentally, the writer has never understood why the wool wheel was not always provided with a groove or some other device to prevent the cord, which acted as a "belt," from slipping off, which, from practical experience, it is very prone to do, especially if the wheel is not lined up with the spindle with the utmost care.

While some spinners turned the wheel with pushes of the hand, others used a *turning rod* (B), or *wheel peg* for this purpose. This was a round stick of wood, — one of curly maple is known — about six inches long and somewhat less than an inch in diameter, with a knob at one end, sometimes at both, which would grip one of the spokes of the wheel to start it with a push. Another accessory, although, judging by the present scarcity of examples of it, an unusual one, was the *roving tub*, — a wooden keg about three feet high and six inches in diameter, in which the carded tufts of wool, or *rovings*,—about twelve inches long and three quarters of an inch thick (K) — were kept ready to hand.

The spinner tied one end of a roving to the point of the spindle and held the other end in her left hand, then started the wheel with her right hand, causing the spindle to revolve at high velocity. She then stepped backwards, drawing back her left hand, stretching out the roving at such an angle that the spindle would impart a twist to it. When the roving was stretched and twisted to her satisfaction, without stopping the wheel, she let the end which was attached to the spindle slip from the point to the shaft, stepped quickly forward, bringing her hand up to the spindle, so that the twisted roving was wound up on it, the end which she had been holding being left projecting for the attachment of another roving. When the spindle had wound up all the wool it would hold, the yarn was reeled off and tied into hanks for knitting and weaving (C, D, F, G).

Professional spinners were employed by master wool combers. The wool was delivered out to the spinner by weight, and when she returned it after spinning, it was again weighed (A). The stipend was meagre. An English writer of 1837 (H) says: "Happily for the poor people who are engaged in the production of woolen threads, this art is still free from the effects of machinery and the very poor weekly earnings of four, five or six shillings (working whole nights) are yet awhile secure in their hands."

A list of "Authorities" is appended for the benefit of those who wish to give the subject more detailed study.

Authorities

(A) *The American Artists' Manual*, by James Cutbush (Philadelphia, 1814), no page numbers, see "Spinning"; (B) *Tools of the Nation Maker*, by Henry C. Mercer, (Doylestown, Pa. 1897). Nos. 207, 592; (C) *Industrial History of the United States*, by A. S. Bolles (Norwich, Conn., 1881) p. 421; (D) *Household Manufactures in the United States*, 1640-1860, by R. M. Tryon (Chicago, 1917), p. 209; (E) *Panorama of Professions and Trades*, by Edward Hazen (Philadelphia, 1837) p. 43; (F) *Scenes of Wealth*, by Isaac Taylor (Hartford, 1826) p. 76; (G) *The First Century of the Republic*, by various authors (New York, 1876) p. 62; (H) *The Complete Book of Trades*, by James Whittock (London, 1837) p. 412; (I) *American Mechanical Dictionary*, by Edward H. Knight (New York, 1874) p. 2274; (J) *The Great Industries of the United States*, by J. B. Burr & Hyde (Hartford, 1873) pp. 1127, 1174; (K) *American Family Encyclopedia*, by Webster & Parkes (New York, 1859) p. 932.

Combustion Engine

(*Continued from page 17, column 2*)

nings, who first introduced commercially a mixture of turpentine and alcohol, called "burning fluid," as a household illuminant. Mr. Morey accidentally discovered, as did others later to their sorrow, that this compound when mixed with air is highly explosive. Forthwith he put his mechanically fertile brain to work to harness the power of the explosion.

A *P. S.* on the letter to Professor Silliman reads, "I am sensible, that a drawing ought to accompany this paper, but at present, it is out of my power to furnish one." The writer has, however, attempted to supply the missing link.

There was first the carburetor (A), as it would be called today, for effecting an intimate mixture of the alcohol-turpentine vapor with air. This was accomplished by an intricate series of baffle plates. The whole was a tin box, 14″ x 7″ x 4″, with an intake (a), for admitting air, a basin at the bottom for containing the liquid alcohol and turpentine, and an outlet (b), opening into the feed tube (c) and closed by a valve. Both intake and outlet were protected by fine wire gauze, — Davy's principle, — for preventing possible explosion in "the preparing part of the machine." A lamp (d), produced enough heat to vaporize the liquid.

The lower end of the cylinder (B), of which there were two, was a perforated, arched, metal plate (e), which supported a soft leather valve (f), the sides of which were held tightly together by two springs, (g). An air valve (h), was fixed in the side of the cylinder, just below the piston at the lowest point of its stroke. The feed tube entered the cylinder at about a fourth of the stroke from the top, and just before entering had a valve (j), opening at the flame of a lamp (k), the spark plug. The valves (b), (h), and (j) were "worked by beams on the crank shaft."

As the piston rose, valve (h) opened, admitting air to prevent the formation of a vacuum. When the piston had reached the opening of the

feed tube, valve (h) closed, valve (b) opened, and the explosive mixture was drawn into the cylinder during the last quarter of the up stroke. It will be noted that this mixture was *beneath* the piston head. Just before the end of the stroke, valve (b) closed, valve (j) opened and shut, the final rise of the piston sucked the flame (k) into the tube, igniting the mixture, and causing an explosion. This explosion would expel the air in the cylinder out through the valve (f), which instantly collapsed, preventing the return of air. With a vacuum thus formed inside the cylinder, the piston descended by atmospheric pressure.

It is indeed strange that having contrived such an ingenious affair, Samuel Morey did not realize that the introduction of the mixture *above* the piston head, as in modern internal combustion engines, thus driving the head down by the force of the explosion, would have added greatly to the amount of power produced.

You were warned at the beginning of the article, that this engine was not going to put you over the country roads at your favorite forty, fifty, or sixty miles per hour, but with it Morey compressed air "over a column of water to such a degree as to throw the water to a great height and distance," and he also utilized his compressed air "for working an engine, similar to a double stroke high pressure steam engine."

So far as the writer knows, this engine never got beyond its laboratory stages, yet, all facetiousness aside, we must marvel at Morey's genius in foreshadowing modern automotive power.

Metal Alloys

(*Continued from last issue*)

Common solder. Put into a crucible 2 pounds of lead, and when melted, throw in 1 pound of tin. This alloy is that generally known as solder. When heated by a hot iron, and applied to tinned iron with powdered rosin, it acts as a cement or solder; it is also used to join leaden pipes.

To plate looking-glasses. This art is erroneously termed silvering, for, as will be presently seen, there is not a particle of silver present in the whole composition.

On tin-foil, fitly disposed on a flat table, mercury is to be poured, and gently rubbed with a hare's foot: it soon unites itself with the tin, which then becomes very splendid, or, as the workmen say, is quickened. A plate of glass is then cautiously to be slid upon the tin-leaf, in such a manner as to sweep off the redundant mercury, which is not incorporated with the tin; leaden weights are then to be placed on the glass, and in a little time the quicksilvered tin-foil adheres so firmly to the glass, that the weights may be removed without any danger of its falling off. The glass thus coated is a common looking-glass. About 2 ounces of mercury are sufficient for covering three square feet of glass.

The success of this operation depends much on the clearness of the glass; and the least dirt or dust on its surface will prevent the adhesion of the amalgam or alloy.

Liquid foil for silvering glass globes. Melt together 1 ounce of clean lead, and 1 ounce of fine tin, in a clean iron ladle; then immediately add 1 ounce of bismuth. Skim off the dross, remove the ladle from the fire, and before it sets, add 10 ounces of quicksilver. Now stir the whole carefully together, taking care not to breathe over it, as the fumes of the mercury are very pernicious. Pour this through an earthen pipe into the glass globe, which turn repeatedly round.

Brass. Put 4½ pounds of copper into a crucible, expose it to heat in a furnace, and when perfectly fused, add 1½ pounds of zinc. The metals will combine, forming that generally used alloy, called brass.

For brass which is to be cast into plates, from which pans and kettles are to be made, and wire is to be drawn braziers use calamine of the finest sort, instead of pure zinc, and in a greater proportion than when common brass is made; generally 56 pounds of calamine to 34 pounds of copper. Old brass, which has been frequently exposed to the action of fire, when mixed with the copper and calamine, renders the brass far more ductile, and fitter for the making of fine wire, than it would be without it; but the German brass, particularly that of Nuremburg, is, when drawn into wire, said to be preferable to any made in England, for the strings of musical instruments.

Pinchbeck. Put into a crucible 5 ounces of pure copper; when it is in a state of fusion, add 1 ounce of zinc. These metals combine, forming an alloy not unlike jeweller's gold: pour it into a mold of any shape. This alloy is used for inferior jewellery.

Some use only half this quantity of zinc, in which proportion the alloy is more easily worked especially in the making of jewellery.

Prince's metal. Melt together 3 ounces of copper, and 1 ounce of zinc: or 8 ounces of brass, and 1 ounce of zinc.

Another. — Melt in a crucible 4 ounces of copper, and when fused, add 2 ounces of zinc; they will combine and form a very beautiful and useful alloy, called Prince Rupert's metal.

(*To be continued in next issue*)

The Cultivator (Albany, N. Y.) for November, 1841, contains an illustration, herewith reproduced from a tracing, of a tool made by a correspondent, which he called a "thistle forceps" and claimed to be very effective in pulling up this weed by the roots. He says that "the whole length is two feet and a half, cut out of inch and a half plank, with the grain running lengthwise of the crook, in order to prevent their splitting off. The length of the jaws four inches, and an inch and a half thick. They are very nearly like blacksmith's tongs. Half the thickness of the handles is taken off as far as the jaw. Where they cross, they are secured by an iron bolt one quarter of an inch in diameter, with a nut to fasten it. They should be made of good timber, and of a natural crook, if it can be found. They are easily made — a man of small mechanical genius will make a pair in an hour and a half — and when they are finished, they are worth about eighteen pence." This tool bears a striking resemblance to that pictured as No. 6 under the heading "What Are They?" in No. 6 of THE CHRONICLE, Vol. I, although of course, the latter is only about a foot long.

THISTLE FORCEPS.

Early American Industries Association

Early American Industries Association

W. B. Sprague, President,
43 Cedar Street, New York

Burton A. Kollmer,
Secretary and Treasurer,
c/o Staten Island Historical Museum,
Richmond, Staten Island, N. Y.

S. E. Gage, Chairman
Admissions Committee,
144-54 Sanford Avenue,
Flushing, N. Y.

Howard G. Hubbard, Chairman
Recruiting Committee,
South Hadley, Mass.

Communications should be addressed as follows: Pertaining to the *contents* of The Chronicle, to W. B. Sprague. Applications for membership, to S. E. Gage. Suggestions of prospective members, to Howard G. Hubbard. Other matters to Burton A. Kollmer. Addresses as above.

This issue was printed by Leon S. Case Flushing, N. Y.

W. B. Sprague, *Editor.*

Our Purpose

The purpose of the association is to encourage the study and better understanding of early American industry, in the home, in the shop, on the farm, and on the sea, and especially to discover, identify, classify, preserve and exhibit obsolete tools, implements, utensils, instruments, vehicles, appliances and mechanical devices used by American craftsmen, farmers, housewives, mariners, professional men and other workers.

Dues

The annual dues are payable September 1st, and are as follows: Regular members $1.00; Contributing members, $2.00; Supporting members, $5.00; Sustaining members, $10.00, and up. There is no distinction between the classes, except the amount of the dues, but the publication of The Chronicle cannot be financed unless a considerable number of the members pay more than $1.00. Each member is expected to voluntarily place himself in the class which represents the amount he is willing to contribute to the support of the Association for the current year. The Chronicle is sent to all members without additional charge. Many of the back numbers may be secured from the Treasurer for 20c each. For further information, address any of the officers.

Obsolete Tools at the Essex Institute

By Willis H. Ropes
(Salem, Mass.)

Visitors to the Essex Institute, at Salem, Massachusetts, who come to see its large and splendid collections of portraits, costumes, furniture and rare old ware and glass, are not usually shown the thousands of old time tools and household appliances which are stored in the basement, as most of them would not be interested. Nearly all of these tools and utensils have been supplanted by modern machinery and their uses would be unknown to the present generation. In the closing of estates and clearing of attics of old families, many were sent to the Institute, but many others had to be sought for; otherwise they would probably have gone to the junk heaps or into the fire.

Salem's wharves were lined with cooper shops a century ago, and all sizes of barrels, from kegs to hogsheads, were made, "shook down" and sent in Salem vessels to foreign ports, where the coopers, who were part of the crew, set them up again to be filled with return cargo. When I tried to find cooper's tools in Salem for the Essex Institute collections, there were none to be had; being adapted only for working in curves, they were of no use for ordinary purposes and had all been discarded as worthless. In Gloucester and Rockport, I finally found the tools used by two old coopers, long since retired from working at their trades. Barrels are now made by machinery in large factories in the cities.

Doubtless, those who have occasion to use a metal plane nowadays never saw a wood plane with steel blade and if they need any mouldings, they go to a planing mill for them. Nearly a century ago, door mouldings and cornices were made by wooden planes with individual steels, and every carpenter had a set of them. I obtained two chests of them from the shop of an old cabinet maker who was a forty-niner and who died on the Isthmus of Chagres fever. They had not been used since. One chest was full of double planes which required two men to work, one to pull, the other to push the plane. The other chest contained single planes for fine, small mouldings. From the same shop, I secured a chest full of small tools and many gross of pointless screws in the original packages. For these, a hole had to be made with a gimlet, and the screw was set into place its full length with screw driver. The invention of gimlet-pointed screws was a great advance in carpentry methods. Nowadays, too often, screws are driven in part way with a hammer, which crushes the wood.

Recently, I showed our old tools to a cowboy, who was showing his slides in natural color of the wonderful mountain scenery of Wyoming before our Chamber of Commerce. He was especially interested in them, and informed me that he still has to use a saddler's vise in repairing harnesses, but his has no legs and he holds it on his lap.

Naturally we have some items of which no one has explained the use. Few guess the use of a five-pronged hook, similar to a grapnel for a boat. This was used to recover a bucket which had broken its chain and fallen into the well. We have a pair of plumber's tools which were used in former days to spread the open end of a lead pipe, to connect it with another piece. Brass or iron pipe is ordinarily used nowadays.

We have a large variety of household appliances, rarely two of a kind, except perhaps bread toasters, yet there are many different types even of them. Apple-parers are especially interesting and vary greatly, some types being very crude.

I hope the above random thoughts will prompt many members of the Early American Industries Association to visit Salem this next summer and see our "great variety of items, too numerous to mention."

Willich's *Encyclopedia* (1821) mentions a machine for making blocks (ships' pulleys) which "performs the several operations from the rough timber to the perfect *block*, in the completest manner possible. The whole is worked by means of a steam engine; the manual labour required is simply to supply the wood as it is wanted to the several parts of the machinery, so that the commonest laborer almost may be made to act in this business with very little instruction."

Some Notes About the Sandwich Glass Company

By Lawrence B. Romaine
(Middleboro, Mass.)

Most of us have seen the old glass and bottle advertisements, even though we have not been privileged to own them. I have newspapers from all over the Eastern States with announcements by Deming Jarves, T. W. Dyott and others. These notices tell us a good many names of things that we can date in this way: they name flasks, druggists bottles, blacking bottles and demijohns: they give a few prices and tell who purchased such ware from 1820 to 1840: they give us an idea of the scope of merchandising of glass in this period. I have old records of auctioneers, telling of the ridiculous prices that lots of ring-neck decanters, blown jelly tumblers and flasks sold for during the 1820's. In short, there is any amount of source material for the student. What I want to present at this time seems to me to go further. I shall start wtih a few quotations from an old ledger.

The Manomet Iron and Machine Company
1851—1854

"N. Sandwich, Jan. 7, 1851. Boston & Sandwich Glass Co.

1 mould casting	7	pounds	@ 8c	.56
1 chaldron	763	"	@ 4c	30.52
3 side door castings	577	"	@ 3c	17.31
19 Lear Machine rolls	63	"	@ 3½c	2.21
1 B. Smith fireback	50	"	@ 3c	1.50
1 press plate	267	"	@ 3c	8.01
3 pot bottoms	639	"	@ 3c	19.17
1 day turning spindle for lathe				3.00
12½ pr. mould hinges			@ 20c	2.50
1 side lear run	183	pounds	@ 3c	5.49
2 furnace doors	428	"	@ 3c	12.84
8 wheels	255	"	@ 3c	7.65
18 moulds	307	"	@ 8c	24.56
1½ days turning on clay machine				4.50
16 grates	438	pounds	@ 3c	13.14
4 casks of nails	400	"		14.00
8 casks of spikes	800	"		28.00
1 deck light mould	46	"	@ 8c	3.68
1 Ox cart delivered in the Glass Yards per Mr. Jarves order.... (Not to be included in this bill rendered July, 1st, 1851)				
47,492 Staves	32 inches		@ 12½c	593.65

Not for a minute do I think that I am going to startle the collecting world with facts hitherto unknown. I do not doubt that records exist that will back up my statements. I only feel that there should be interest in the actual cost of running the Sandwich works; not being a statistician, I should say, "partial cost." The books of the Manomet Iron Company certainly record a large part of the production. It might almost be assumed that the Sandwich Company purchased all the iron articles which it needed from such a conveniently accessible manufacturer and it would seem reasonable to believe that all of the repairing of such articles was done by the same company. According to the records, the Sandwich Company even bought all of their barrel staves in Manomet.

Assuming that the sixteen pages of entries, from January 7 to July 7, 1851, record the greater part of the purchasing and repairing expense of the Glass House, we arrive at a total cost of $3,874.30 for the six months. This covers making and repairing moulds, replacing furnace doors, mending all kinds of machinery, purchases of nails and general hardware, barrels and crates, carts and transportation of scrap iron. I cannot even suggest a figure which would include taxes, wages, fuel and all the rest. I haven't the information at hand nor the records to work from.

The reader will be perfectly justified in saying, "Yes, go on. Then what happened." I haven't very far to go. I am romancing. The manuscript records fascinated me and made me feel that they contained a story, but perhaps there isn't any. Possibly one might wonder what had become of the huge iron oven doors. Possibly one might speculate as to what the "deck light mould" would be worth if found, and whether anyone would care what it cost in the beginning. An original Sandwich barrel, authenticated as having been made from some of the 47,000 staves purchased by Deming Jarves in 1851, would certainly command a throne, and the ox cart, perhaps with the original bill tied to the door, would indeed be a most intriguing thing to even talk about owning. If any of these things turn up in the future, I shall claim the discovery,—in research, though not in fact.

I hope that some of these costs of operating the Sandwich Factory have yet to be found. I feel as though the records are of value, although it is difficult to prove any conclusions. The few items I have listed do not give a very clear picture of the mass of small jobs being done every day. Nails, barrel staves and spikes were ordered in large lots, but the making of moulds and various small mending jobs were undertaken every day. Great hunks of iron that tell a fanciful tale of production were discarded and sold for scrap. If I owned item No. 1, Jan. 7th, 1851, and the record said "mould for eagle stippled salt," many people would have an insatiable desire to own it. However, the record of the making of that mould, the laboriously scribbled item in the old ledger and the feeling of its authenticity is enough for me.

The familiar frame in which oxen are raised off the ground to be shod, by means of a winch and leather sling, was apparently unknown, or at least not in general use, in 1821. Willich's *Domestic Encyclopedia*, published in that year, says (Vol. III, p. 521): "This operation (shoeing) is usually performed by casting them on their backs, when the farrier proceeds to affix the shoes, in a manner similar to that practised on horses. By such attempts, however, they are liable to numerous accidents, for the prevention of which, an ingenious machine has been contrived, in order to secure the animals by means of short posts. On these, the fore or hinder legs are fastened according to circumstances: and thus the shoes are applied, so that it is almost impossible to injure the helpless creature."

Early American Industries Association

Membership

Membership lists should be amended as follows: (N) indicates new member; (S) indicates non-member subscriber; (Ch) indicates change of address; (D) indicates decease.

CONNECTICUT

Groton: Butler, Mrs. Eva L., Box 224 (N); Butler, S. B., Superintendent of Schools (N)
New Canaan: McGrath, Larry, 55 East Ave. (N)
Waterford: Stacy, Mrs. Leroy, Niantic River Rd. (N)

DISTRICT OF COLUMBIA

Washington: Brown, W. E., 4800 Wisconsin Ave. (N)

MASSACHUSETTS

South Boston: Schumann, Mrs. Isabel M., 322 K St. (N)

NEW YORK

Mount Ivy: Mayer, Peter (N)
Mount Kisco: Wright, Miss Esther Knox, R. F. D. 2 (N)
New York: Conant, Fred, 210 East 68th St. (N); Ferriera, George D., Gate House, Edgewater Park, Miles Ave. (N); Minahan, Mrs. Mary E., 445 Riverside Drive (N)
Sparkhill: Mullan, Austin P., Box 325 (N)

RHODE ISLAND

Providence: Harris, Mrs. Herbert, 112 Franklin St. (N)
Rumford: Dodge, W. B., 1370 Pawtucket Ave. (N)

WEST VIRGINIA

Wheeling: Sanborn, Herbert J., Ogleby Park (N)

The Questionnaire

Questionnaires recently received have been tabulated as follows. For key to abbreviations, see page 7.

CONNECTICUT

New Canaan: Larry McGrath (D). Deals in FT. Write*.

KENTUCKY

Louisville: Robert F. Cate (C), 409 So. 5th St. Collects FT, HD, HF, KH, LD, TC, WM. Wants LP. Write. Visit (collection at Prospect, Ky.)

NEW JERSEY

Paterson: Miss Marguerite B. Tiffany (C), 330 E. 33rd St. Collects KH, LD, SM, WM. Wants LP. Write. Visit.

NEW YORK

Mount Kisco: Miss Esther Knox Wright, R. F. D. 2. Interested in authentic information about all early American industries for use in writing fiction with historical background. Wants LP.
New York: George O. Ferriera, (C) Gate House, Edgewater Park, Miles Ave., The Bronx. Collects all kinds of antiques. Wants LP.
New York: Peter Haselbauer, (C) 260 E. 72nd St. Collects LD, especially betty lamps marked with maker's name. Wants LP. Write*. Visit.
Sparkhill: Austin P. Mullan (C), Box 325. Collects TC, especially cabinet-making tools for restoration purposes. Wants LP. Write*. Visit.

"The Ohio Frontier Series, 1768-1847"

Mrs. Rhea Mansfield Knittle, of Ashland, Ohio, a member of the Association, is publishing a series of pamphlets, under the above caption, to be issued at intervals of six months. Each pamphlet will contain about forty-eight pages of text, including a foreword, a condensed review of the particular subject, pertinent notes, costs and price lists, definite check lists, and suggested books and magazine and newspaper articles for supplementary reading. The subjects, in order of publication, will be as follows: 1. Early Ohio Taverns: Tavern-sign, Stage-coach, Barge, Banner, Chair and Settee Painters; 2. The Pioneer Potters and Their Wares; 3. Fashioners of Fire-arms and Blades: Munitions-makers; 4. Professional Weavers of Textiles: Spinning-wheel and Reel-makers; 5. The Dish-timber Men: Coopers: Wood Carvers and Sculptors; 6. Iron-forgers and Iron-casters: Bell and Brass Founders; 7. Chair and Settee Makers: Clock-makers; 8. Glass-house Proprietors, their Hands, and Production; 9. Tin- and Copper-smiths: The Pewterers; 10. Cabinet-makers: Organ and Piano Builders; 11. The Silver-smiths and their Problems; 12. Wall-paper, Band-box, Cornice, Venetian-blind, Mirror, and Picture-frame Makers; 13. Coffin-makers, Tomb-table Chippers, Stone Carvers and Sculptors; 14. The Silhouettist, The Worker-in-Wax, The Daguerrean Artist; 15. The Amateur Actor, the Itinerant Painter.

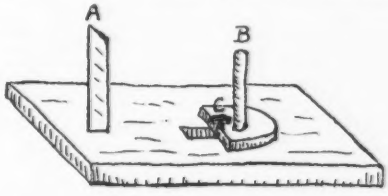
For further information, communicate with Mrs. Knittle.

Foot Warmers

The typical New England foot warmer consists of a cubical box made of tin plate, perforated with many holes (often arranged to form an elaborate pattern), enclosed in a wooden frame with turned posts, and provided with a wire handle with which to carry it. There is a door in one side of the box, and inside should be (although it is often missing) a square shallow iron pan, in which the fuel (preferably charcoal) was burned to provide the heat. Less frequently met with are those which are built entirely of wood, especially if elaborately carved, such as No. 3755 in Mr. Wallace Nutting's *Furniture Treasury*. Mr. Nutting also shows (No. 3837) a foot warmer made of brass, and the writer has heard of, but not seen, one made of copper, which was found in North Carolina. Round ones of any material appear to be very scarce. Dr. Henry C. Mercer states, in *Tools of the Nation Maker* (No. 289), that the foot warmer became obsolete in Pennsylvania about 1840. Apparently they were never in as general use there as they were in New England, if the relative number still in existence is any criterion. According to Helen Evertson Smith's *Colonial Days and Ways*, a person might be fined as much as 10 shillings, in 1768, for not taking his foot warmer from church when he left, as unattended they were a serious fire hazard.

Candle Wick Cutter

Rivington's *Trades* (London, 1827), states (p. 324) that, in making candles, the wicks were cut with a machine, which consisted of a smooth board, to be held on the knees, on the upper surface of which were fixed the blade of a razor and a round piece of cane, placed at a certain distance from each other, according to the desired



CANDLE WICK CUTTER

length of the wick. The free end of cotton was carried around the cane and cut from the ball by bringing it against the edge of the razor. Hazen's *Trades* (Philadelphia, 1837) also describes (p. 78) this contrivance, and the accompanying rough sketch is from an illustration in Abraham Rees' *Cyclopedia or Universal Dictionary of Arts, Sciences and Literature* (London, 1820), Vol. ii of plates. In this example, the post around which the cotton was twisted (B) could be moved further from or nearer to the blade (A), and then held stationary by means of the set screw (C). Has any of our readers seen one of these?

COMMUNICATIONS

From Mr. Newton C. Brainard:

"The September Chronicle has an inquiry by Mr. Mann regarding wooden butter prints. I do not know anything about them, but had one which I just purchased for a friend. It is a circular one, pound mold, with design carved on the face of the plunger. It is stamped, 'Patented April 17, 1866,' which would indicate that it was a commercial product. The carving is quite deep and remarkable for the complete absence of tool marks. It seems to have been done by someone so experienced that the various cuts were made with a single sweep of the tool.

The November issue brings to mind two matters. One is the article by Doctor Epstein on crutches. He might be interested to learn that in Essex, Connecticut, was shown in a historical exhibit a few years ago, what they call the "town crutch." Apparently this was passed from one cripple to another over a period of about eighty years or more and on it the user cut his name, date, and the nature of his injury.

The other matter was the mention of the Landis Valley Museum in the Pennsylvania article. The last issue of the *National Geographic Magazine,* in an article about Hungary, tells how they have created a museum to collect and preserve the peasant arts and trades."

From Mr. Rudolf P. Hommel:

"To the inquiry of Miss Betty Cummings, in the September, 1937, issue of The Chronicle, about the marks on the thumbpiece of 'hog-scraper' candlesticks, I can add that two iron candlesticks in my collection are marked respectively SHAW and SHAW BIRM. This seems to refer to a maker with the name of Shaw who worked in Birmingham, England. The advertisements in 18th century newspapers of New England show conclusively that large quantities of Birmingham hardware were sold in the colonies. The Boston *News-Letter* of July 17th, 1760, carries a long list of articles 'Just Imported By Edward Blanchard, and to be Sold at his Shop in Union-Street, near the Conduit, By wholesail or retail, cheap for Cash' and among the array iron candlesticks are specifically mentioned."

From Mr. George R. Cope:

"On the last page of The Chronicle for November, 1937, you show a diagram of a machine and ask for suggestions as to its probable use. I have studied the layout of the machine and have shown it to several others and we have all agreed that it was used for making rope,—probably of hay, grass or straw. I have in my collection a separate tool like the part marked (B), except that mine has a handle on it, which was worked by hand. In my early boyhood days, I remember having helped my grandfather make rope of hay with a hand machine. Someone would turn the handle and it was my job to feed the hay and walk backwards till the rope was the required length and thickness. These ropes of hay were used to put over hay and straw stacks. We used a stone weight on both sides of the stack — to prevent its being blown away. There is no doubt in my mind that this machine was made for this purpose, as it would be in use through New England in the time when most all the hay and straw would be put out in stacks and it would be necessary to have such rope. I think this machine would speed up production by making two ropes at one time. The shaft marked (D) might have been to wind the finished product on."

Mr. Floyd L. Thoms sends us the following copy of an advertisement in the *Republican Farmer,* published at Bridgeport, Connecticut, in 1810. He found it pasted on the inside of a chest of that period:

"At the Palace of Bois le Duc, 7th of May, 1810.

Napoleon, by the grace of God, and the Constitutions, Emperor of the French, King of Italy, Protector of the Federation of the Rhine, Mediator of the Swiss Confederation, etc., etc.

Being particularly interested in the progress of the manufactures of our Empire, of which flax is the prime material; considering that the only obstacle in the way of their uniting cheapness of price to perfection of workmanship, results from the imperfection of the machines for spinning flax, compared with those of spinning cotton, we have decreed, and do decree as follows —

Art. 1—A premium of one million of francs shall be given to the inventor, in any nation whatever, of the best machine proper for spinning flax.

Art. 2—For this purpose, the sum of one millions, is put at the disposal of our Minister of the interior.

Art. 3—This our decree shall be translated into all languages, and sent to all our Ambassadors, Ministers, and Consuls in Foreign Countries, to be there made public.

Our Ministers of the interior, of the treasury, and for foreign affairs, are charged with the execution of the present decree.

(*Signed*) Napoleon
by the Emperor.

The Minister, Secretary of State,
(*Signed*) H. L. Duke of Bassano,
For Amplification.

The Minister of the interior,
Count of the Empire.
Montelivit."

From Mr. Howard G. Hubbard:

"Heating houses by steam is by most of us thought to be a comparatively recent invention. *The Philosophical Magazine,* London, June, 1801, has an article by Count Rumford on the heating of liquid by means of steam pipes running through a vat. Two paragraphs in that article set the date for the invention of steam heating close to two hundred years ago:

'More than fifty years ago, Colonel William Cook, in a paper presented by him to the Royal Society, and published in their Transactions, made a proposal for warming rooms by means of metallic tubes filled with steam, and communicating with a boiler situated out of the room; which proposal was accompanied with an engraving, which showed, in a manner perfectly clear and distinct, how this might be effected. Since that time this scheme has frequently been put in practice, with success, both in this country and on the continent.

'Although one should naturally imagine that the notoriety of these facts would have been sufficient to prevent all attempts in our days to claim a right to this invention, yet it is said that a patent for it was taken out only a few years ago.'"